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April 12, 2004

1632 '04 APR 21 P1:28

Docket Management Branch (HFA-305)
Food and Drug Administration
Room 1061
5630 Fishers Lane
Rockville, MD 20852

[Docket No. 2003N-0076: Food Labeling: Trans Fatty Acids in Nutrition Labeling; Consumer Research to Consider Nutrient Content and Health Claims and Possible Footnote or Disclosure Statements; Reopening of the Comment Period: 69 Federal Register 40 March 1, 2004]

Dear Sir or Madam:

Stepan Company appreciates the opportunity to comment on a topic related to the Food and Drug Administration's (FDA) advanced notice of proposed rulemaking on establishing qualifying criteria for nutrient content claims about trans fatty acids. Stepan Company provided comment related to the July 11, 2003 Federal Register announcement of FDA's intention to require the labeling of trans fatty acids and would like to take a second opportunity to request the FDA re-evaluate the terminology and definition of saturated fats. Due to the increasing body of evidence that dietary trans isomers raise blood cholesterol levels, thereby increasing the risk of arteriosclerosis and coronary heart disease, consumers will seek alternatives to trans fat. A general shift away from trans fatty acids will challenge the food industry to offer healthier alternatives. Therefore, consumers should not be misled by the misrepresentation that medium-chain triglycerides (MCT) are saturated fats that raise low-density lipoproteins (LDL) and total cholesterol. Including MCTs in the definition of saturated fat without clearly understanding the physiological effects will exaggerate the amount of unhealthy saturated fat in a person's diet and will mislead the consumer.

Stepan Company is a major manufacturer of triglycerides for use in the food, flavor, personal care and cosmetic industries. Growth is expected in the use of medium-chain triglycerides at 10% a year (1).

FDA published in March 1, 2004 Federal Register that *both trans fat and saturated fat raise LDL and total cholesterol levels*, which are potential contributors to coronary heart disease. Stepan Company is concerned with the accuracy of this statement as it relates to classifying medium-chain triglycerides as a saturated fat.

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Stepan Company kindly requests the FDA to consider:

1) amending the nutritional labeling regulation to exclude medium-chain fatty acids from the definition of saturated fat.

or

2) maintaining the definition of saturated fat in Sec. 101.9(c)(2)(i), yet exclude medium-chain fatty acids from the quantitative measurement of *Total Saturated Fat* on the nutrition facts panel.

Including medium-chain triglycerides within the scope of total saturated fat, and therefore in one numerical value for the percent daily value (DV) on the nutrition facts panel, will mislead the consumer related to nutrient content claims for saturated fat and cholesterol, lean and extra lean claims, and health claims that contain a message about cholesterol-raising lipids.

Medium-chain triglycerides are a unique class of lipids that are composed mainly of caprylic (C_8; 50-80%) and capric fatty acids (C_{10}; 20-50%) with a minor level of caproic (C_6; 1-2%) and lauric (C_{12}; 1-2%) fatty acids. MCTs are metabolized differently than long-chain triglycerides (LCT). In LCT absorption, fatty acid chains are separated from the glycerol backbone by the lipase enzyme. These fatty acids form micelles, are absorbed and reattached as glycerol, and the resultant triglycerides travel through the lymphatics to the bloodstream (2). MCTs have a unique metabolism being preferentially absorbed without the need for micelle formation and transported to the liver for preferential oxidation by the portal vein (3). Consequently, MCTs are a good energy source for patients having impaired absorption of traditional long-chain triglycerides. MCTs have also been promoted for other uses, such as enteral and parenteral nutrition and appetite control. Research has demonstrated that diets rich in MCTs may aid in the prevention of obesity (4) or potentially stimulate weight loss (5).

Classifying MCTs as saturated fats that raise LDL and total cholesterol level need further interpretation and clarification. Lack of conclusive evidence should not warrant incorporation of MCTs as part of the saturated fat definition, it should warrant exclusion until a consistent pattern of scientifically valid evidence is shown. As stated in the January 6, 1993 preamble of the food labeling regulation, "the agency recognizes that there is substantial controversy as to which saturated fatty acids are cholesterolemic and which are not.....The effects of most individual saturated fatty acids on blood total and LDL-cholesterol are not fully understood. The agency finds that the only saturated fatty acid that has been consistently reported as cholesterol-raising is myristic acid."

In 1990 (55 FR 29495), FDA proposed to continue to define saturated fatty acids as the sum of lauric, myristic, palmitic and stearic acids. It was pointed out that C_{12-18} fatty

acids are a vast majority of fatty acids, and it is C_{12-16} fatty acids that raise the total LDL. FDA did not set a trans fat criterion for most claims because the evidence suggesting that trans fatty acids raise serum cholesterol was inconclusive at the time (58 FR 2302 at 2332 and 2340). Yet, FDA decided to include all saturated fatty acids without double bonds in the saturated fat definition with inconclusive evidence of the effect of medium-chain fatty acids.

A sample of current literature is summarized below that refutes MCT's negative effect on blood cholesterol levels.

Woolett, Spady and Dietschy (6) compared the effects of MCT, hydrogenated coconut oil, and chow, either with or without added dietary cholesterol, on cholesterol metabolism in hamsters. The researchers found that feeding MCT either with or without added dietary cholesterol consistently increased receptor-dependent LDL transport in both the liver and other tissues. Despite an increase in LDL production rate in hamsters fed the MCT diet (presumably due to increase very low-density lipoprotein (VLDL) production), the increased clearance capacity prevented a large increase in plasma LDL cholesterol when compared to hamsters fed the low fat, chow control diet. As Hill, et. al. note, "These observations in hamsters raise the possibility that similar changes in LDL clearance capacity may occur in humans during MCT feeding, mechanism that could provide the basis for a reduction in circulating LDL cholesterol concentration."

In two recent clinical trials, St Onge, et. al. tested an oil made of MCT, tall oil phytosterols and flaxseed oil. When introduced to a functional oil, MCTs can be consumed without adverse effect of CVD risk. Authors show that dietary intake of MCT, in the context of weight management, can also be advisable for cardiovascular disease (CVD) risk management (7).

A 2002 study investigated the effects of MCTs on serum lipid levels, liver function, and hepatic fat accumulations in healthy men. Eleven subjects consumed 2200-2600 kcal daily, the fat included 40 g of MCTs or else 40 g of long-chain triglycerides (blended vegetable oil). Significant differences were not found in the concentrations of serum total cholesterol, very low-density lipoprotein cholesterol, low-density lipoprotein cholesterol, and high-density lipoprotein cholesterol between the groups. Serum triglycerol levels were not significantly different in the groups. The results suggest that the long-term effects of dietary MCTs on serum cholesterol were similar to those of unsaturated fatty acids found abundantly in vegetable oil (8).

In a randomized, crossover study, Dr. Nilo Carter from the Center for Human Nutrition suggests MCTs *raise* LDL and total cholesterol at half the potency of palmitic acid (9). However, if you take a closer look, subjects in the study were fed MCTs at 53% fat with 43% of calories. These levels are much higher than the fat intake in the typical American diet (37%) and the US dietary goal (=< 30% fat calories). Also, the MCT diet contained a relatively low amount of linoleic acid. The typically US diet contains 4-7%

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linoleic acid. In contrast, the MCT diet in the study contained less than 3%. Low levels of linoleic acid in the diet will accelerate the rate at which the body produces long-chain saturated fatty acids from the medium-chain acids (de novo lipogenesis). The high total fat and MCT content as well as limited linoleic acid intake contributed to the cholesterol-raising effect of MCTs reported by the authors.

Similar in subject to the above citation, Hayes explains in "Medium-chain triacylglycerols may not raise cholesterol," "MCTs should not be considered as saturated fatty acids that raise total cholesterol and LDL. Nor do they represent a substitute for 18:2 that will effectively reduce circulating apolipoprotein B-rich lipoproteins in the absence of 18:2" (10).

MCTs or products containing MCTs represent a viable alternative to products containing trans fats. Having to label MCTs as saturated fats reduces the likelihood that they will be used for this purpose. Defining MCTs in 1993 as a saturated fat that increase LDL and total cholesterol was based on limited data.

As FDA continues to consider the development of a joint DV for saturated and trans fat and qualifying criteria for nutrient content claims, we urge the FDA to re-examine classifying medium-chain triglycerides as a saturated fat or allow industry to exclude calculating MCTs as part of the *Total Saturated Fat* content on the nutrition label. Once again, thank you for allowing us the opportunity to comment on saturated fat classification as it relates to industry's compliance with trans fat nutrition labeling and claims.

Respectfully,

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REFERENCES

(1) De Guzman D. Fat Replacers Poised for Rebound in the US. *Chemical Market Reporter.* February 25, 2002.

(2) Medium chain triglycerides monograph. *Alternative Medicine Review.* 2002. 7(5): 418-420.

(3) Bach AC and VK Babayan. Medium-chain triglycerides: an update. *Am. J. Clin. Nutr.* 1982. 36: 950-962.

(4) St Onge MP and PJH Jones. Physiological effects of medium-chain triglycerides: potential agents in the prevention of obesity. *J. Nutr.* 2002. 132: 329-332.

(5) Bach AC, Y Ingenbleek and A Frey. The usefulness of dietary medium-chain triglycerides in body weight control: fact or fancy? *J. Lipid Res.* 1996. 37: 708–726.

(6) Woolett LA, DK Spady and JM Dietschy. Mechanisms by which saturated triacylglycerols elevate the plasma low density lipoprotein-cholesterol concentrations in hamsters: differential effects of fatty acid chain length. *J. Clin. Invest.* 1989. 84: 119-128.

(7) St-Onge MP, B Lamarche, JF Mauger and PJH Jones. Consumption of a Functional Oil Rich in Phytosterols and Medium-chain Triglycerides Oil Improves Plasma Lipid Profile in Men. *J. Nutr.* 2003. 133: 1815-1820.

(8) Nosaka N, M Kasai, M Nakamura, I Takahasi, M Itakura, et. al. Effects of Dietary Medium-Chain Triacylglycerols on Serum Lipoproteins and Biochemical Parameters in Healthy Men. *Bioscience, Biotechnology and Biochemistry.* 66(8): 1713-1718.

(9) Carter MB, HJ Heller and MA Denke. Comparison of the effects of medium-chain triglycerols, palm oil and high oleic acid sunflower oil on plasma triacylglycerol fatty acids and lipid and lipoprotein concentrations in humans. *Am. J. Clin. Nutr.* 1997: 65: 41-45.

(10) Hayes KC. Medium-chain triacylglycerols may not raise cholesterol. *Am. J. Clin. Nutr.* 2000. 72: 1583-1593.